CLAIMS

What is claimed is:

1   1.   A digital imaging system comprising:

2   an imaging system configured to provide image data of an image, the

3   image data comprising digital image data for a plurality of pixel locations; and

4   processing circuitry configured to process the image data provided by the

5   imaging system to denoise and sharpen the image data, wherein the processing

6   circuitry, for an individual one of the pixel locations, is configured to:

7   identify a respective subset of the image data corresponding to the

8   one pixel location; and

9   perform a single processing operation using the image data of the

10   identified subset of the image data to denoise and sharpen the image data of the

11   individual one pixel location.

1   2.   The system of claim 1 wherein the processing circuitry is

2   configured to perform the single processing operation using a robust estimation

3   filter.

1   3.   The system of claim 1 wherein the processing circuitry is

2   configured to perform the single processing operation using a robust estimation

3   filter without division operations.

1   4.   The system of claim 1 wherein the processing circuitry is

2   configured to perform the single processing operation using the image data

3   comprising information regarding a plurality of colors at individual ones of the

4   pixel locations.

1   5.   The system of claim 1 wherein the processing circuitry is

2   configured to perform the single processing operation using the image data

3   comprising luminance information.

1   6.   The system of claim 1 wherein the processing circuitry is
2   configured to identify the respective subset of the image data comprising image
3   data of a plurality of other pixel locations.

1   7.   A digital imaging system comprising:
2   imaging means for providing image data of an image, the image data
3   comprising digital image data for a plurality of pixel locations; and
4   processing means for denoising and sharpening the image data of the
5   pixel locations comprising for an individual one of the pixel locations:
6   identifying a respective subset of the image data comprising image
7   data of the one pixel location and image data of at least one other pixel location;
8   and
9   processing the image data of the one pixel location and the other
10   pixel location using a robust estimation filter to at least one of sharpen and
11   denoise the image data of the one pixel location.

1   8.   The system of claim 7 wherein the processing comprising
2   processing using the robust estimation filter comprising a bilateral filter.

1   9.   The system of claim 7 wherein the processing comprising
2   processing using the robust estimation filter comprising a bilateral filter without
3   division operations.

1   10.   The system of claim 7 wherein the processing comprises
2   processing the image data after demosaicing operations.

1   11.   The system of claim 7 wherein the processing the image data
2   comprising processing the image data comprising luminance information.

1   12.   An article of manufacture comprising:

2   a processor-usable medium comprising processor-usable code configured

3   to cause processing circuitry to:

4   access image data for a plurality of pixel locations of an image,

5   wherein the image data comprises color information for a plurality of colors for

6   individual ones of the pixel locations;

7   identify one pixel location;

8   identify a plurality of other pixel locations responsive to the

9   identification of the one pixel location; and

10   apply a robust estimation filter to the image data of the one pixel

11   location and the other pixel locations to at least one of sharpen and denoise the

12   image data of the one pixel location.

1   13.   The article of claim 12 wherein the code is configured to cause the

2   processing circuitry to apply the robust estimation filter comprising a bilateral

3   filter.

1   14.   The article of claim 12 wherein the code is configured to cause the

2   processing circuitry to apply the robust estimation filter comprising a bilateral

3   filter without division operations.

1   15.   The article of claim 12 wherein the code is configured to cause the

2   processing circuitry to demosaic the image data and to apply the robust

3   estimation filter to the image data after the demosaicing.

1   16.   The article of claim 12 wherein the image data comprises

2   chrominance information and luminance information and the code is configured

3   to cause the processing circuitry to apply the robust estimation filter to the

4   luminance information of the image data.

1   17.   A digital image processing method comprising:

2   providing image data of an image, the image data comprising digital image

3   data for a plurality of pixel locations; and

4   processing the image data comprising sharpening and denoising the image

5   data using a robust estimation filter.

1   18.   The method of claim 17 wherein the robust estimation filter

2   comprises a bilateral filter.

1   19.   The method of claim 17 wherein the robust estimation filter

2   comprises a bilateral filter without division operations.

1   20.   The method of claim 17 wherein the processing comprises

2   processing in a single processing operation.

1   21.   The method of claim 17 further comprising demosaicing the image

2   data, and the processing comprises processing after the demosaicing.

1   22.   The method of claim 17 wherein the providing image data

2   comprises providing image data comprising a plurality of colors for individual

3   ones of the pixels.

1   23.   The method of claim 17 wherein the image data comprises

2   chrominance and luminance information, and wherein the sharpening and

3   denoising comprise sharpening and denoising only the luminance information.

1   24.   The method of claim 17 wherein the processing comprises

2   adjusting image data of one of the pixel locations using image data of at least

3   one other pixel location.

1   25.   The method of claim 24 wherein the adjusting comprises adjusting

2   to denoise the image data responsive to a difference of the image data of the

3   one and the other pixel locations being less than a threshold and adjusting to

4   sharpen the image data responsive to a difference of the image data being

5   greater than the threshold.

1   26.   The method of claim 25 wherein the adjusting to sharpen the

2   image data comprises adjusting responsive to a difference of the image data

3   being less than another threshold.

1   27.   The method of claim 24 further comprising applying square root

2   operations to the image data of the one pixel location and the image data of the

3   other pixel location before the adjusting.